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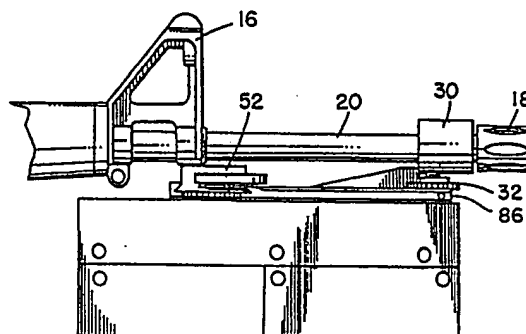
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⑸ Mount for attaching a device to a firearm.

⑸ A mount for attaching a device to a firearm includes a longitudinal base adapted to carry the device to be mounted. The base has a track extending along a portion of the length thereof and a block is slidably mounted in the track. The block is biased toward the front end of the base by a spring. The block is adapted to be attached to a first fixed member at one end of a firearm barrel. The rear end of the base is adapted to be attached to a second fixed member at the other end of the firearm barrel. When properly mounted between the ends of the firearm barrel, the mount is held in place by the action of the spring, which forces the block attachment against the first fixed member and the rear attachment against the second fixed member. The rear attachment can also include spring means to prevent the mount from wobbling from side-to-side when attached to the first and second fixed members.



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MOUNT FOR ATTACHING A DEVICE TO A FIREARMTECHNICAL FIELD

This invention relates to weapons, such as firearms which are laser aimed, and more specifically
5 relates to a mount for attaching a device, such as a laser gunsight, to a weapon.

PRIOR ART

Laser aiming devices for firearms are well known. Examples of such devices are disclosed in
10 U.S. Patents 4,152,754; 4,233,770; 4,313,272; and 4,313,273. In each of the devices disclosed in these patents, it is important that the laser beam emitting device be properly mounted to the firearm in order to obtain accurate aiming. The
15 mounts for the lasers shown in these patents cannot readily be attached and removed from the weapon. It would be advantageous, however, to have a mount which can quickly be attached and detached from the weapon for immediate interchange
20 for use on another weapon or for storage when not in use.

Other considerations are important in providing a means for quickly mounting and detaching a laser gunsight from a weapon. For example, since the combined weight of the weapon and its ammunition becomes critical in combat situations where maneuverability in the field is essential, it is important that any mounting means be lightweight. Further, in order to provide economy and convenience, it would be advantageous to provide a mount which requires no modification to the weapon. Such a mount should also provide adjustment for windage and elevation, enabling the laser gunsight to be removed from the weapon and remounted and still remain properly aligned. Further, there should be no interference with the conventional sights of the weapon, thereby allowing the user an instant choice as to which aiming method is used.

The present invention provides such a mount.

20

SUMMARY OF THE INVENTION

In accordance with the present invention, a mount for attaching a device to a firearm is provided which comprises a longitudinal base adapted to carry the device to be mounted and having a track extending along a portion of the length thereof. A block is slidably mounted in the track, and spring means is provided for biasing the block toward one end of the base. First means is mounted to the block and adapted to be attached to a first fixed member at one end of a firearm barrel. Second means is provided for

attaching the other end of the base to a second fixed member at the other end of the firearm barrel.

The device is mounted by attaching the
5 first means to the first fixed member, sliding the base forward relative to the block until the second means is in a position to be attached to the second fixed member, aligning the second means with the second fixed member, and releasing
10 the mount to cause the base to slide rearward with respect to the block in response to the biasing action of the spring means, thereby engaging the second means with the second fixed member.

Means for providing windage and elevation
15 adjustment can be included on the mount. The second means can comprise a second block containing a notch adapted for mating engagement with a portion of the second fixed member, which may, for example, be a bayonet holder fixed to the
20 firearm. A pair of pivoting lever arms with tabs extending into the notch can be provided, with means for spring loading the tabs in the notch to lock the second means onto the second fixed member.

In a second embodiment of this invention,
25 a U-shaped anti-wobble spring is provided above the second means to grasp and surround the second fixed member on the firearm to substantially preclude side to side or lateral movement of the mount.

30 The second means can comprise a second lock containing a notch adapted for mating engagement with a portion of the second fixed member, which may, for example, be a bayonet holder fixed to the firearm. A single pivoting lever arm with a

tab extending into the notch can be provided,
with means for spring loading the tab in the
notch to lock the second means onto the second
fixed member. The U-shaped anti-wobble spring is
5 mounted in the block above the lever arm to surround
and grasp the bayonet holder once the tab extends
into the notch to lock the second means onto the
second fixed member or bayonet holder.

The mount is particularly suited for mounting
10 a laser gun sight to a conventional weapon.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view showing a
laser gunsight mounted to a weapon using the
mount of the present invention;

15 Figure 2 is a side view of the gunsight as
it is being mounted to the weapon;

Figure 3 is a side view of the mounted
gunsight;

20 Figure 4 is an exploded perspective view
of the mount of the present invention;

Figure 5 is a top view of the mount of the
present invention;

Figure 6 is a sectional view taken substantially
along lines 6-6 of Figure 5;

25 Figure 7 is a sectional view taken substantially
along lines 7-7 of Figure 6;

Figure 8 is a bottom perspective view of
the second block of the mount of the present
invention;

30 Figure 9 is an exploded perspective view

of a second embodiment of the mount of the present invention;

Figure 10 is a top view of the mount of Figure 9;

5 Figure 11 is a sectional view taken substantially along line 11-11 of Figure 10;

Figure 12 is a sectional view taken substantially along line 12-12 of Figure 11; and

10 Figure 13 is a bottom exploded perspective view of the second block of the mount of Figure 9.

DETAILED DESCRIPTION

As shown in Figure 1, a laser gunsight generally designated 10 is mounted to weapon 14 using the mount of the present invention. Laser gunsight 10 includes a laser which emits a beam from opening 12 and includes a self-contained power source, such as batteries.

20 A first means, shown in this embodiment as an open collar 30, encircles one end of the barrel 20 and abuts the rear of a first fixed member, shown in this embodiment as a flash suppressor 18, of weapon 14. A second means, shown as a clip 52, clips to a second fixed member, shown in 25 this embodiment as a bayonet holder 16, of weapon 14, the mount being held in place by a spring force which urges open collar 30 away from clip 52 as explained hereinbelow.

Turning now to Figure 4, each of the parts of the mount of the present invention are shown.

Open collar 30 is secured to block 44 by a threaded shaft 42. One end of threaded shaft 42 is tapered outwardly to form a head 46. A bore 45 in threaded shaft 42 is provided for housing a spring 40
5 which biases a plastic bearing 38. A top bushing 48 is press fit into hole 47 in block 44. A bottom bushing 50 is press fit into hole 49 of block 44. Threaded shaft 42 is pushed from the bottom of block 44 into bottom bushing 50, through
10 top bushing 48, and is screwed into open collar 30. A elevation thumb wheel 32 is sandwiched within block 44 and threadedly engaged with threaded shaft 42. Spring 36 biases ball bearing 34 against the edge of thumb wheel 32, which includes a
15 plurality of detents 33 for accommodating the ball bearing 34, in order to prevent a change in elevation setting due to vibration or other unintended movement of thumb wheel 32. By turning thumb wheel 32 clockwise, open collar 30 is raised with
20 respect to block 44. Turning elevation thumb wheel 32 counter-clockwise causes open collar 30 to move closer to block 44. Head 46 on threaded shaft 42 prevents open collar 30 from being raised so much that it separates from block 44. Once
25 head 46 contacts bottom bushing 50, further clockwise movement of thumb wheel 32, and resultant upward movement of open collar 30, will be prevented.

Block 44 slides in a track 96 in base 86 of the mount. A spring 84 biases block 44 toward
30 the front end 83 of base 86. Bores 108 and 110 in base 86 accommodate springs 105, 111 and ball bearings 107, 109 respectively. Springs 105 and 111 bias ball bearings 107 and 109 upwardly against

block 44 to compensate for any tolerance variations within block 44 or track 96. A pin 88 is inserted in holes 90, 92 at the front end 83 of base 86 to limit the sliding movement of block 44 and to prevent block 44 from being inadvertently removed from base 86.

A notch 94 is cut in base 86 at the rearward end of track 96. Notch 94 provides a space in which a user can insert his finger to wipe away any mud or other debris that would otherwise collect in track 96 and interfere with the sliding operation of block 44 in base 86.

Second block, or "clip" 52 is slidably mounted for side to side movement within track 100 of base 86, toward the rear end 85 of base 86. Second block 52 contains a notch 82 adapted for mating engagement with a portion of bayonet holder 16 of a firearm 14 as shown in Figures 1-3. A pair of lever arms 54, 56 are pivotally mounted by pins 58 and 60, which are inserted into holes 78, 80 of block 52. Tabs 53 and 55 on lever arms 54 and 56, respectively, extend into notch 82 of second block 52. Spring 62 spring loads tabs 53 and 55 into notch 82 to lock the second block 52 onto the bayonet holder 16 of weapon 14. This locking arrangement is most clearly shown in Figure 7.

Second block 52 also includes a bore 76 therein, which accommodates a ball bearing 75 biased by a spring 74 which is secured in place by a set screw 73. When second block 52 is locked in place on the bayonet holder 16 of a weapon 14, spring loaded ball bearing 75 serves to compensate for any tolerance variations in slot 82 of second

block 52 or in the corresponding portion of the bayonet holder 16.

As noted hereinabove, second block 52 is slidably mounted in track 100 of base 86 for side to side movement. This structure provides for windage adjustment. Windage is the disturbance of air around a moving projectile, such as a bullet. A windage adjustment compensates for the displacement of the bullet by the wind, by slightly shifting the aim of the gunsight. In the present invention, windage adjustment is provided by thumb wheel 70 which has an offset hole 72 for accommodating a pin 68. Thumb wheel 70 fits within circular cut-out portion 98 of base 86. Pin 68 rides in slot 112 of second block 52, as shown in Figure 8. A bearing 64 biased by pressure spring 66 rides between second block 52 and thumb wheel 70.

In order to assemble the windage adjustment mechanism, thumb wheel 70 is first placed in circular recess 98 of base 86. Second block 52 is then slid into track 100 of base 86. Spring 66 and bearing 64 are sandwiched between second block 52 and thumb wheel 70 as second block 52 is slid into track 100. Guide pin 68 is then pushed through hole 72 from underneath base 86, until guide pin 68 is positioned within slot 112 of second block 52. A set screw 102 holds a spring 104 against ball bearing 106 in rear end 85 of base 86. Ball bearing 106 rides against the edge of thumb wheel 70, which contains a plurality of detents 69, to prevent thumb wheel 70 from moving, and hence the windage adjustment from being affected, by vibration or other movement of the mount.

The placement of mount 10 on a weapon will now be explained with reference to Figures 2 and 3. The first step in placing the mount on the weapon is to place open collar 30 about the weapon barrel 20 to abut the rear of flash suppressor 18. Base 86 is then slid forward relative to the flash suppressor 18 and firearm barrel 20 until second block 52 is in a position to be attached to bayonet holder 16. The rear end of base 86 is then pivoted upwardly toward the firearm, and the base is released to cause it to slide rearward with respect to block 44 in response to the biasing action of spring 84, thereby engaging second block 52 to bayonet holder 16.

Turning now to Figures 9 to 13, each of the parts of a modified embodiment of the mount of the present invention are shown. Open collar 130 is secured to block 144 by a threaded shaft 142. One end of threaded shaft 142 is tapered outwardly to form a head 146. A bore 145 in threaded shaft 142 is provided for housing a spring 140 which biases a plastic bearing 138. A top bushing 148 is press fit into hole 147 in block 144. A bottom bushing 150 is press fit into hole 149 of block 144. Threaded shaft 142 is pushed from the bottom of block 144 into bottom bushing 150, through top bushing 148, and is screwed into open collar 130. An elevation thumb wheel 132 is sandwiched within block 144 and threadedly engaged with threaded shaft 142. Spring 136 biases ball bearing 134 against the edge of thumb wheel 132, which includes a plurality of detents 133 for accommodating the ball bearing 134, in order to prevent a change in elevation

setting due to vibration or other unintended movement of thumb wheel 132. By turning thumb wheel 132 clockwise, open collar 130 is raised with respect to block 144. Turning elevation
5 thumb wheel 132 counter-clockwise causes open collar 130 to move closer to block 144. Head 146 on threaded shaft 142 prevents open collar 130 from being raised so much that it separates from block 144. Once head 146 contacts bottom bushing
10 150, further clockwise movement of thumb wheel 132, and resultant upward movement of open collar 130, will be prevented.

Block 144 slides in a track 196 in base 186 of the mount. A double spring 184 comprising
15 a component 184B inside a component 184A for added stiffness, biases block 144 toward the front end 184 of base 186. Bores 208 and 210 in base 186 accommodate springs 205, 211 and stub
20 platforms 207, 209 respectively. Springs 205 and 211 bias stub platforms 1107 and 1109 upwardly against block 144 to compensate for any tolerance variations within block 144 or track 196. A pin
25 188 is inserted in holes 190, 192 at the front end 183 of base 186 to limit the sliding movement of block 144 and to prevent block 144 from being inadvertently removed from base 186.

A notch 194 is cut in base 186 at the rearward end of track 196. Notch 194 provides a space in which a user can insert his finger to
30 wipe away any mud or other debris that would otherwise collect in track 196 and interfere with the sliding operation of block 144 in base 186.

Second block, or "clip" 152 is slidably mounted for side to side movement within track

200 of base 186, toward the rear end 185 of base 186. Second block 152 contains a notch 182 adapted for mating engagement with a portion of a bayonet holder 16 or 116 of a firearm 14 as shown in
5 Figures 1-3. A lever arm 156 is pivotally mounted by pin 160, which is inserted into hole 180 of block 152. Tab 155 on lever arm 156 extends into notch 182 of second block 152. Spring 162 spring loads tab 155 into notch 182 to lock the second
10 block 152 onto the bayonet holder 16 or 116 of weapon 14. This locking arrangement is most clearly shown in Figures 6 and 7.

Second block 152 also includes a U-shaped anti-wobble spring 173 mounted in notch 182 above
15 lever arm 156 by a screw 178 which extends through an opening 177 in the bight portion of spring 173 and is threadedly received in a threaded bore 179 in clip 152. When second block 152 is locked in place on the bayonet holder 116 of a weapon 14,
20 the legs 174 and 175 of spring 173 surround bayonet holder 116 (as shown in Figure 12) to prevent wobble or side to side movement of the clip 152 relative to weapon 14.

As noted hereinabove, however, second
25 block 152 is slidably mounted in track 200 of base 186 for side to side movement relative to base 186. This structure provides for windage adjustment. Windage is the disturbance of air around a moving projectile, such as a bullet. A
30 windage adjustment compensates for the displacement of the bullet by the wind, by slightly shifting the aim of the gunsight. In the present embodiment, windage adjustment is provided by thumb wheel 170 which has an offset hole 172 for accommodating a

pin 168. Thumb wheel 170 fits within circular cut-out portion 198 of base 186. Pin 168 rides in slot 212 of second block 152, as shown in Figure 13. A ball bearing 164 seated on a stub
5 platform 165 biased by pressure spring 166 rides between second block 152 and thumb wheel 170.

In order to assemble the windage adjustment mechanism, thumb wheel 170 is first placed in circular recess 198 of base 186. Second block
10 152 is then slid into track 200 of base 186. Spring 166, platform 165 and bearing 164 are sandwiched between second block 152 and thumb wheel 170 as second block 152 is slid into track 200. Guide pin 168 is then pushed through hole
15 172 from underneath base 186, until guide pin 168 is positioned within slot 212 of second block 152. A set screw 202 holds a spring 204 against ball bearing 206 in rear end 185 of base 186. Ball bearing 206 rides against the edge of thumb
20 wheel 170, which contains a plurality of detents 169, to prevent thumb wheel 170 from moving, and hence the windage adjustment from being affected, by vibration or other movement of the mount.

The placement of mount 110 on a weapon is
25 identical to that explained with reference to Figures 2 and 3. The first step in placing the mount on the weapon is to place open collar 130 about the weapon barrel 120 to abut the rear of flash suppressor 118. Base 186 is then slid
30 forward relative to the flash suppressor 118 and firearm barrel 20 until second block 152 is in a position to be attached to bayonet holder 16 or 116. The rear end of base 186 is then pivoted upwardly toward the firearm, and the base is

released to cause it to slide rearward with respect to block 144 in response to the biasing action of spring 184, thereby engaging second block 152 to bayonet holder 116.

5 Although the invention has been described and illustrated with respect to preferred embodiments thereof, it will be apparent to those skilled in the art that many modifications and changes in the apparatus may be made without departing from
10 the spirit and scope of the invention as defined in the claims appended hereto. For example, a mount in accordance with the present invention can be attached to different types of firearms. If the firearm of interest does not contain a
15 bayonet holder, the mount can be installed between the flash suppressor at the muzzle end of the barrel, and any fixed member, such a bipod attachment, which exists at the other end of the barrel.

 For purposes of this disclosure, the "ends"
20 of the firearm barrel are not meant to necessarily be the absolute ends of the tube forming the barrel; rather, while one of the ends of the barrel is generally the muzzle of the firearm, the other one of the ends can, for example, be
25 the portion of the barrel which is adjacent the forestock of the firearm. Depending upon the type of firearm used, a mount in accordance with the present invention can utilize the forestock

of the weapon as the "first fixed member" or
"second fixed member", with the muzzle end of the
barrel, and particularly the flash suppressor
mounted thereto, serving as the other "fixed
5 member".

It should be appreciated that the spring
biased sliding block arrangement of the present
invention can be adapted to attach a wide variety
of devices to many different types of firearms.

CLAIMS

1. A mount for attaching a device to a firearm characterized by:

a longitudinal base adapted to carry the device to be mounted and having a track extending
5 along a portion of the length thereof;

a block slidably mounted in said track;
spring means for biasing said block toward one end of said base;

first means mounted to said block for
10 attachment to a first fixed member at one end of a firearm barrel; and

second means for attaching the other end of said base to a second fixed member at the other end of the firearm barrel;

15 whereby the device is mounted by attaching said first means to said first fixed member, sliding the base forward relative to said block until said second means is in a position to be attached to the second fixed member, aligning
20 said second means with said second fixed member, and releasing said mount to cause the base to slide rearward with respect to the block in response to the biasing action of said spring means, thereby engaging said second means with said second fixed
25 member.

2. The mount of claim 1 further characterized by means operatively associated with said second means for providing windage adjustment.

3. The mount of claim 2 further characterized by means operatively associated with said first means for providing elevation adjustment.

4. The mount of claim 1 further characterized by means operatively associated with said first means for providing elevation adjustment.

5. The mount of claim 1 wherein said second means is characterized by a second block containing a notch adapted for mating engagement with a portion of said second fixed member, a pair of pivoting lever arms with tabs extending into said notch, and means for spring loading said tabs in said notch to lock the second block onto said second fixed member.

6. The mount of claim 5 wherein said second block is slidably mounted for side to side movement within said base, further characterized by means for providing windage adjustment by changing the side to side position of the second block in said base.

7. The mount of claim 6 further characterized by means operatively associated with said first means for providing elevation adjustment.

8. The mount of claim 5 wherein said second block is adapted to engage the bayonet holder of a firearm.

9. The mount of claim 8 wherein said first means characterized by an open collar adapted to encircle the barrel and abut the rear of the flash suppressor of a firearm.

10. The mount of claim 1 wherein said first means characterized by an open collar adapted to encircle the barrel and abut said first fixed member.

11. The mount of claim 1 further characterized by a thumb wheel assembly operatively associated with said first means, for providing elevation adjustment, said thumb wheel having a plurality of detents on the edge thereof, and a spring biased bearing adapted to exert a force against the detented edge of said thumb wheel.

12. The mount of claim 1 further characterized by a thumb wheel assembly operatively associated with said first means for providing windage adjustment, said thumb wheel having a plurality of detents on the edge thereof, and a spring biased bearing adapted to exert a force against the detented edge of said thumb wheel.

13. The mount of claim 1 further characterized by a thumb wheel assembly mounted to said second means for providing elevation adjustment, said thumb wheel having a plurality of detents on the edge thereof, and a spring biased bearing adapted to exert a force against the detented edge of said thumb wheel.

14. The mount of claim 1 further characterized by a thumb wheel assembly mounted to said second means for providing windage adjustment, said thumb wheel having a plurality of detents on the edge thereof, and a spring biased bearing adapted to exert a force against the detented edge of said thumb wheel.

15. The mount of claim 1 further characterized by a said second means including;

a second block containing a notch adapted for mating engagement with a portion of said second fixed member, a pivoting lever arm with a tab extending into said notch to lock the second block onto said second fixed member, and;

a U-shaped spring member above said lever arm for engaging about a second fixed member.

16. The mount of claim 15 wherein said second block is slidably mounted for side to side movement within said base;

and means for providing windage adjustment by changing the side to side position of the second block in said base.

17. The mount of claim 16 further characterized by means operatively associated with said first means for providing elevation adjustment.

18. The mount of claim 17 wherein said second block is adapted to engage the bayonet holder of a firearm.

19. The mount of claim 18 wherein said first means is characterized by an open collar adapted to encircle the barrel and abut the rear of the flash suppressor of a firearm.

20. The mount of claim 19 further comprising thumb wheel assembly operatively associated with said first means, for providing elevation adjustment, said thumb wheel having a plurality of detents on the edge thereof, and a spring biased bearing adapted to exert a force against the detented edge of said thumb wheel.

21. The mount of claim 20 further characterized by a thumb wheel assembly operatively associated with said first means for providing windage adjustment, said thumb wheel having a plurality of detents on the edge thereof, and a spring biased bearing adapted to exert a force against the detented edge of said thumb wheel.

22. Apparatus for mounting a laser aiming device to a weapon having a bayonet holder and a barrel mounted flash suppressor characterized by:

5 a base adapted to be mounted to a laser aiming device;

a block slidably mounted to said base;

spring means for biasing said block toward the front end of said base;

10 an open collar mounted to said block and adapted to encircle the weapon's barrel and abut the rear of the weapon's flash suppressor;

a clip mounted to the rear end of said base and adapted to be clipped to the weapon's bayonet holder;

15 means for providing a windage adjustment by altering the lateral position of said clip with respect to said base; and

means for providing an elevation adjustment by raising or lowering the vertical position of
20 said open collar with respect to said base;

whereby a laser aiming device attached to said base is mounted to the weapon by placing said open collar about the weapon's barrel to abut the rear of the flash suppressor, sliding
25 the base forward relative to the flash suppressor and barrel until said clip is in a position to be clipped to the bayonet holder, pivoting the rear end of said base toward said weapon, and releasing said base to allow it to slide rearward toward
30 said bayonet holder in response to the biasing action of said spring means, thereby latching said clip to said bayonet holder.

23. The mount of claim 22 wherein said windage and elevation adjustment means each comprise:

(i) a thumb wheel having a plurality of detents on the edge thereof, and

5 (ii) a spring biased bearing adapted to exert a force against the detented edge of said thumb wheel.

24. The mount of claim 22 further comprising a plurality of bearings sandwiched between said base and said block, and means for biasing said bearings to compensate for tolerance variations
5 between said base and said slidably mounted block.

25. The mount of claim 22 wherein said clip comprises a second block containing a notch adapted for mating engagement with a portion of the bayonet holder of the weapon, a pair of pivoting
5 lever arms with tabs extending into said notch, and means for spring loading said tabs in said notch to lock the clip onto the bayonet holder.

26. The mount of claim 25 wherein said second block contains means for compensating for tolerance variations between said notch and said mating portion of said bayonet holder.

27. The mount of claim 26 wherein said compensating means comprises a spring loaded bearing mounted within said second block and adapted to exert a force against said mating
5 portion of said bayonet holder.

28. The mount of claim 22 further characterized by a said second means including;

5 a second block containing a notch adapted for mating engagement with a portion of said second fixed member, a pivoting lever arm with a tab extending into said notch to lock the second block onto said second fixed member, and;

a U-shaped spring member above said lever arm for engaging about a second fixed member.

FIG. 1.

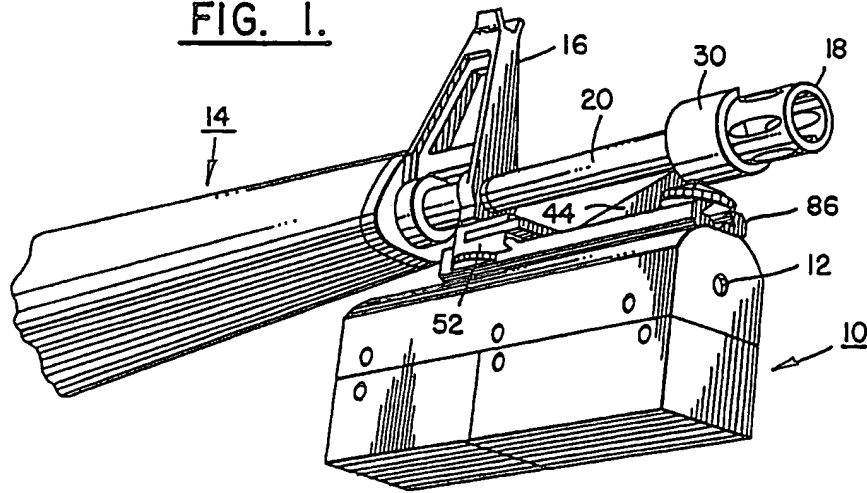


FIG. 2.

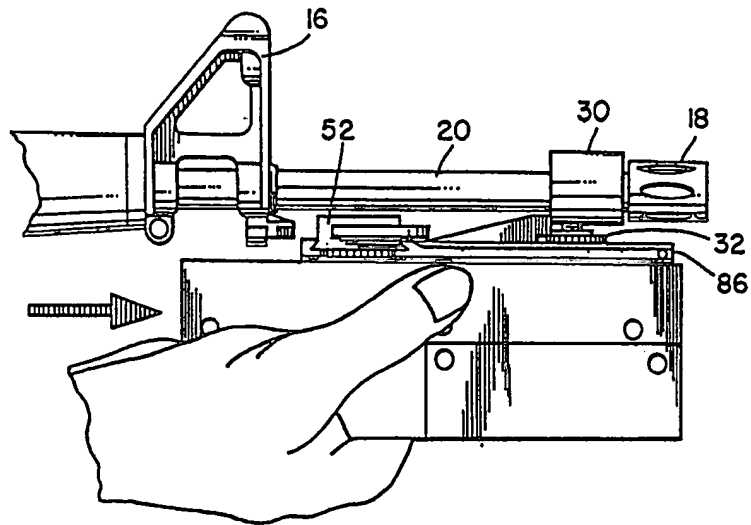


FIG. 3.

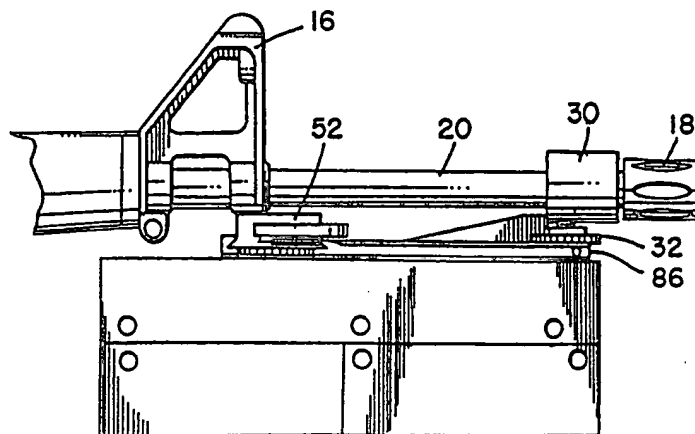


FIG. 4.

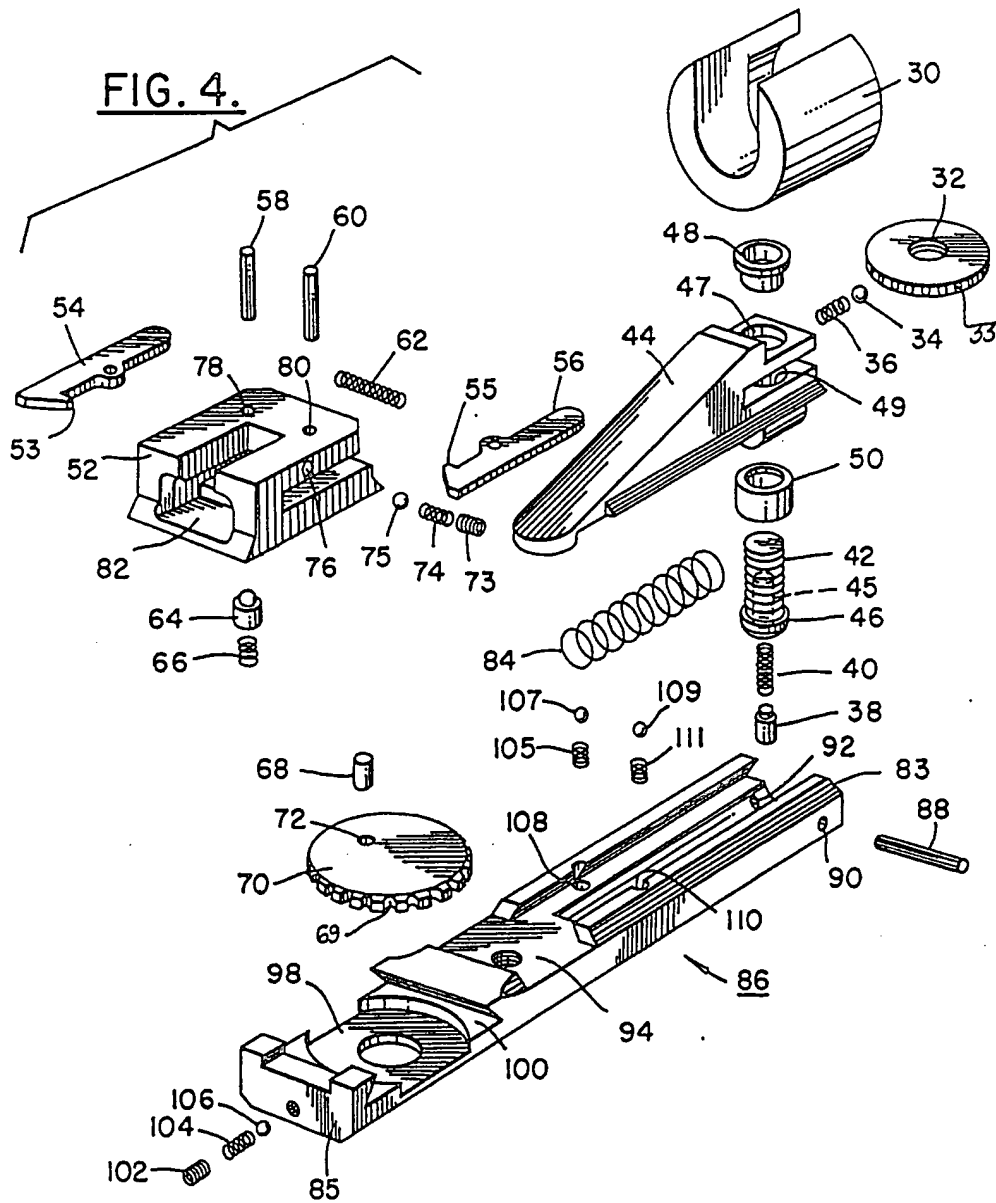


FIG. 5.

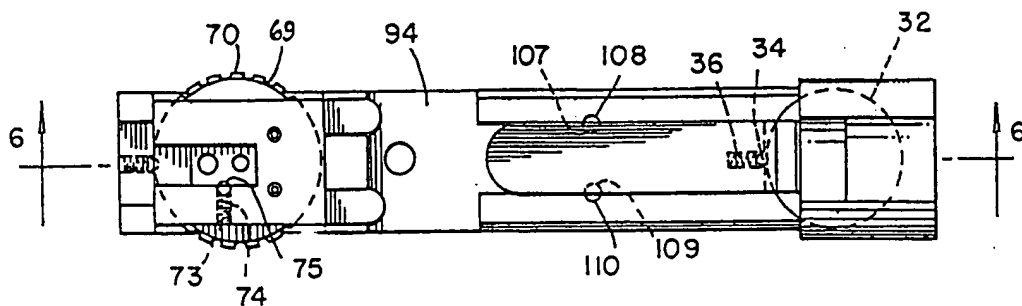


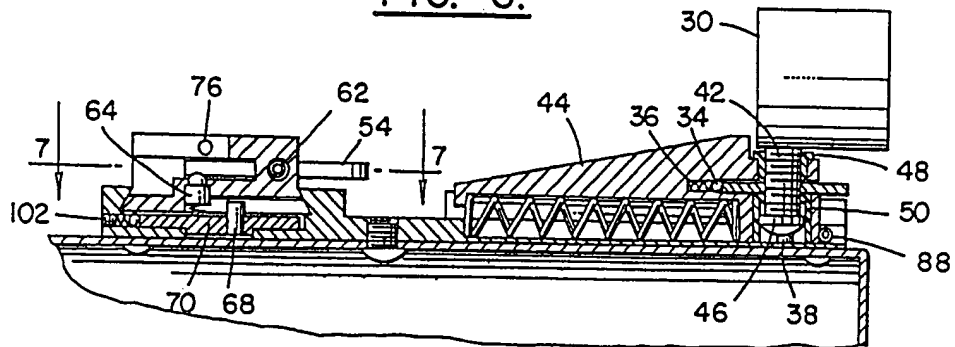
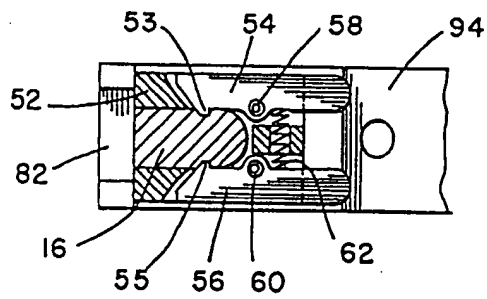
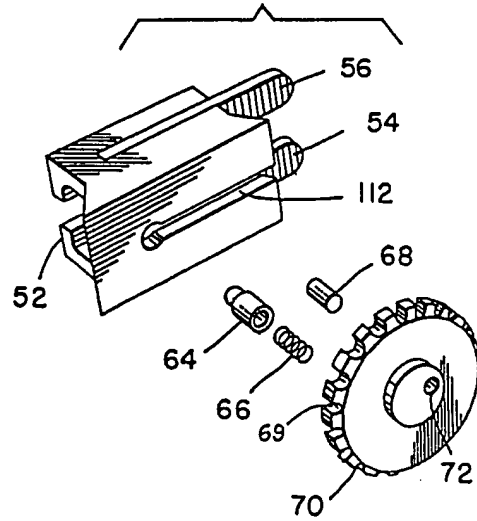
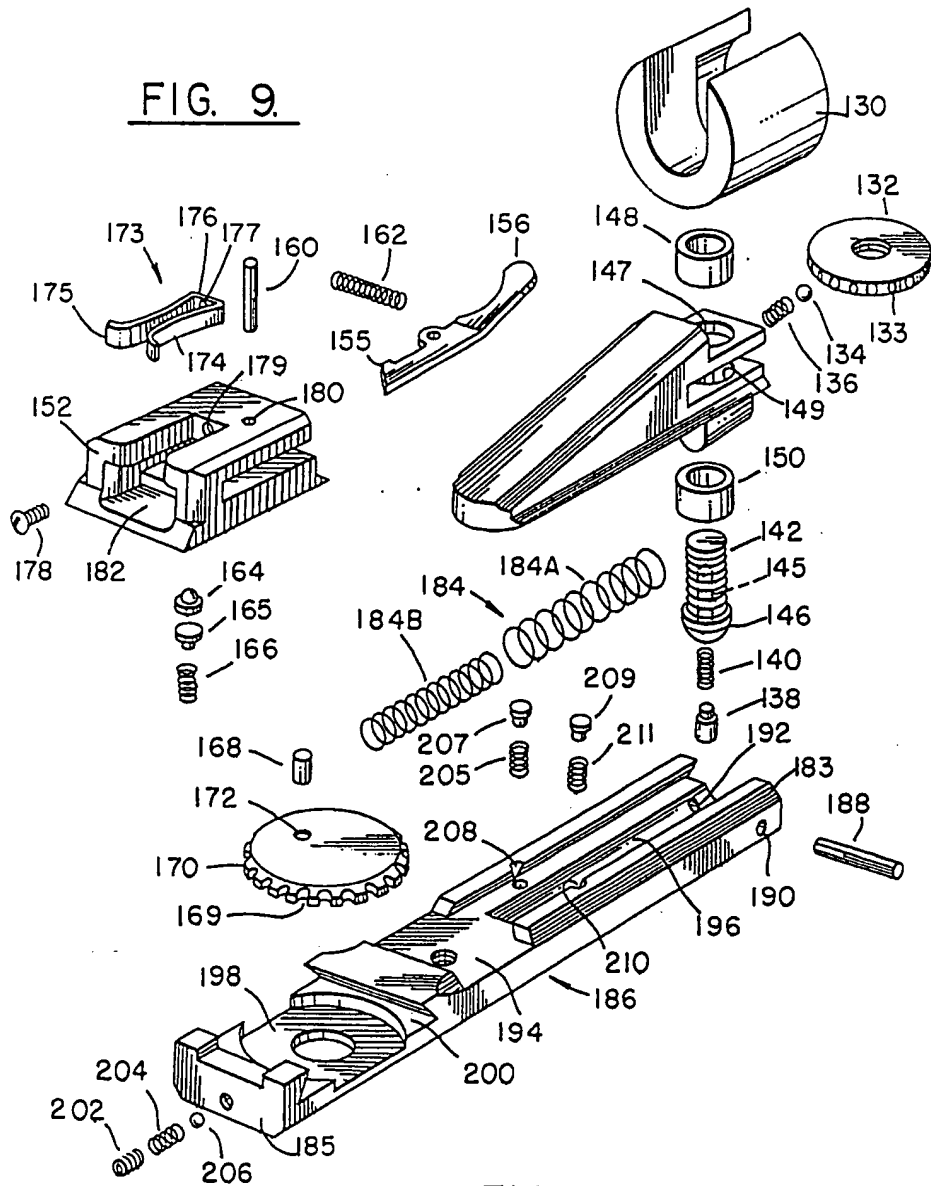
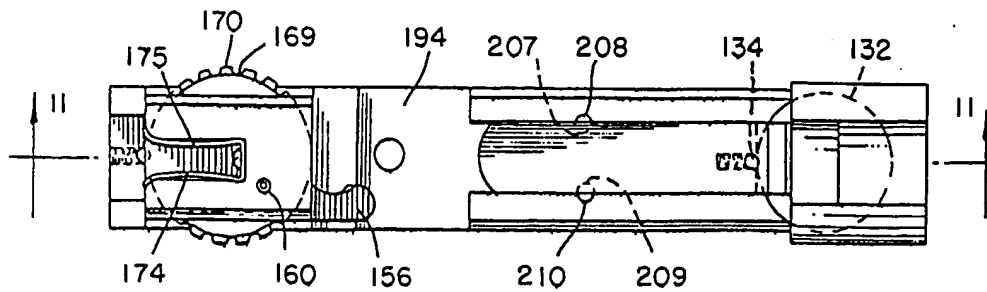
FIG. 6.FIG. 7.FIG. 8.

FIG. 9.FIG. 10.



European Patent
Office

EUROPEAN SEARCH REPORT

Application number
0130347

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 84105910.8
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 7)
A	<u>DE - C - 282 874</u> (FIJDELANDS SIKTEKIKKERT) * Gesamt * --		F 41 G 1/34
A	<u>CH - A - 399 959</u> (ERNST LEITZ GMBH) * Gesamt * --		
A	<u>US - A - 4 328 624</u> (CECIL J. ROSS) * Gesamt * --		
A	<u>US - A - 2 836 895</u> (E. P. DILLON) * Gesamt * --		
A	<u>US - A - 2 649 779</u> (R.R. HARDGROVE et al.) * Gesamt * ----		TECHNICAL FIELDS SEARCHED (Int. Cl. 7) F 41 C 21/00 F 41 G 1/00 F 41 G 11/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 27-09-1984	Examiner KALANDRA
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	